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HYPNOTISM;
WITH A CRITICISM ON SOME RECENT EXPERIMENTS AT LA SALPÊTRIÈRE.

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PERHAPS no branch of physiology has received so much attention of late years as the localization of cerebral faculties; and thanks to the researches of recent observers, among the most distinguished of whom are some of our own countrymen, the localization of function stands out in bold relief from the ordinary course of events, as marking an epoch in the history of medicine, to which there is nothing parallel in modern times; but although the motor region of the cortex cerebri has been mapped out with marvellous precision and exactitude, a less satisfactory result has been attained in reference to the localization of sensorial centres, and this remark applies especially to the visual centre; for, although, thanks to the labors of Ferrier, Schäfer, Sanger-Brown, and others in this country, and of a host of scientific workers on the Continent and in America, a flood of light has recently been thrown upon it, I am justified in saying that in the year of grace 1890, the most conflicting views prevail in reference to this branch of cerebral physiology—the exact localization of the visual centre.

I can readily imagine that some of my readers may say, What can the visual centre have to do with hypnotism and with the Salpêtrière experiments? I trust to be able to show that the subject I am considering has a direct bearing on the physiology of vision, and the communication which I venture to make to this journal may be deemed as supplementary to an essay on the visual centre which I have lately published in a scientific journal, "Les Archives de Neurologie," edited by M. Charcot.

Perhaps few subjects have attracted more attention lately than hypnotism, or the production of artificial sleep, and as some remarkable experiments made at La Salpêtrière have recently been brought under my notice, I have been induced to make them the subject of a communication to this journal, and I am especially induced so to do, as I do not agree with the inference that the originators of these experiments have sought to deduce from them; and here I would remark that by the influence of Charcot and Richet at Paris, Bernheim and Beaunis at Nancy, and Hack Tuke in this country, men of science are turning their attention to the study of hypnotic phenomena, instead of leaving them to charlatans and unscientific observers.

As the result of Professor Charcot's experiments in hypnotism, two conditions have been described, called respectively "hysterical lethargy" and the "cataleptic state."

It is reported that most cases of grave hysteria can be thrown into the first of these two conditions by directing the eyes to be fixed steadily on some point—the tip of a penholder held in the hand, for instance; in a few moments the head inclines to the right or to the left, the eyelids close, the limbs become motionless and limp, but the power of speaking remains. This is the condition of hysterical lethargy in which, amongst other symptoms, there is marked neuro-muscular excitability, a phenomenon first observed by M. Charcot, and which he designated "hyper-excitabilité neuro-musculaire des hypnotiques," and which consists of the aptitude of voluntary muscles to contract under the influence of simple mechanical irritation.

It is easy to cause the patient to pass from the hypnotic condition to the cataleptic stage. All that is required is to open the eyelids and allow the retinæ to be stimulated by the rays of light; the patient immediately becomes cataleptic, but a remarkable difference is observed between the two sides, as shown by the following experiment made by M. Lepine, one of M. Charcot's assistants.

A female patient is hypnotized; if asked to speak, write or make any gesture whilst in this condition, she obeys. The left eyelid is then opened and the left retina stimulated, thus plunging the right hemisphere into a state of catalepsy; there is no change from a linguistic point of view; the patient continues to speak, to write and to gesticulate. The process is modified; the left eyelid is closed and the right opened with corresponding stimulation of the right retina, thus plunging the left hemisphere into a state of catalepsy; immediately all communication with the external world is suppressed, the patient can neither speak, write, nor gesticulate. "Le masque facial reste muet." A moment before, when the right hemisphere was in a cataleptic condition, every form of language subsisted; now that a similar condition is induced in the left hemisphere, language of every kind is abolished.

The above experiment was repeated in the case of another patient who knew by heart some pieces of poetry. Whilst in the hypnotic state, she repeated certain verses distinctly. The left eyelid was raised, but she continued her recitation; but on the left lid being closed and the right opened, thus producing catalepsy in the left hemisphere, she straightway ceased to speak in the middle of a verse, sometimes even in the middle of a word. On closing the right eyelid, she began her recitation again at the very place at which she left off, recommencing sometimes in the middle of a word.

M. Ballet, in commenting upon the above curious phenomena, lays great stress upon their value as experiments *in vivo*, tending to confirm the results of clinical observation, which would place the seat of speech in the left anterior lobe to the exclusion of the right. Now, I am not intending to enter upon the question as to whether the speech-centre, if there be one, is situated in this or that part of the brain ; I have discussed this subject at considerable length elsewhere. This is not the time or the place to discuss the general question of the localization of speech, but I simply moot the question as to whether the deductions drawn from these experiments are not open to doubt. I think they are ; at all events they are certainly not beyond the reach of fair and legitimate criticism.

In the first place, although the results claimed for them are so startling and of such momentous importance, I am not aware that they have even been confirmed by subsequent observers. I find that my scepticism is shared by no less an authority than Professor Bernheim of Nancy, who, in a private communication to me, attributes the phenomena observed to "suggestion." "It has been thought," says he, "at La Salpêtrière, that the hypnotized, whilst in a state of lethargy, are unconscious and do not hear; whereas they hear everything, and often strive to guess what the observer is desirous of eliciting from them. A hypnotized person who has never witnessed Charcot's experiments, and who is not aware of what is desired of her, will certainly never exhibit the phenomena described. It is certainly an affair of *suggestion ;* the experiments are misleading, and can in nowise help to solve the difficult questions connected with the pathology of aphasia."

My friend, Dr. Hack Tuke, whose researches upon this subject are so well known, has favored me with a letter in reply to my inquiry, in which he says that he has never been able to convince himself that hypnotic experiments, which appear to support the alleged function of Broca's convolution, are free from that subtile and constant source of fallacy—unintentional suggestion. In an article on "Artificial Insanity," in the "Journal of Mental Science" for 1865, and also in his "Influence of the Mind upon the Body, with especial Reference to the Imagination" (1872), Dr. Tuke has insisted on the numerous influences of imagination and suggestion in so-called animal magnetism and hypnotism.

Furthermore, whilst engaged in writing this paper, my attention has been called to a report of a curious illustration of the effects of hypnotic suggestion, lately witnessed at St. James' Hall, London. It is stated that a mesmerist threw a gentleman, named King, into a mesmeric trance so profound that the passage of a needle through the fleshy part of his arm caused no sensation. In this state, Mr. King gave humorous lectures and very curious imitations of Mr. Gladstone, Mr. Irving, Mr. Grossmith, and Dr Parker. He was told by the mesmerist that he was each and all of these persons, and, quite unconsciously, he accepted the responsibility: the will became the slave of a suggestion; an automaton was substituted for the true volitional self.

Moreover, Professor Charcot himself, as I have elsewhere stated, admits that hysterical mutism can be produced artificially by hypnotism; and in the appendix to the third volume of his "Diseases of the Nervous System," one of his pupils, M. Cartaz, thus describes in detail how, by hypnotic suggestion, hysterical mutism is produced: During the period of somnambulism the patient is made to converse; the observer, then lowering his voice, says to her: "I don't understand you. What do you say? Why, you can't speak," and in an instant the patient is aphasic, being unable to speak or to phonate. This, says M. Cartaz, is the exact representation of the mental disturbance observed in hysterical patients.

Whilst, therefore, recognizing the scientific interest attaching to these curious experiments, I cannot admit that the inference that has been drawn from them is a logical one; and I think they should not be cited as confirmatory of the localization of speech in the left hemisphere.

I am not at all sure that there may not be also an anatomical objection to the deductions which have been drawn from these experiments.

In a former paper I have entered at some length into the consideration of the different theories of the visual centre, and I have shown that the whole subject is far from being definitely settled, as the most divergent notions exist as to the course of the fibres at the optic chiasma, between it and the mesocephalic ganglia, and again between these and the cerebral cortex.

Moreover, Charcot's assumption, that there is a supplementary crossing of the fibres of the optic tracts in the corpora quadrigemina, by which all fibres from one retina would pass to the opposite hemisphere, is by no means recognized as absolutely correct; indeed, Charcot himself speaks of it as only an hypothesis, not based at present on any anatomical grounds, but nevertheless supplying a ready means of presenting, in a very simple form, the rather complex facts revealed by clinical observation.

I need scarcely point out that if there be no other decussation of the optic fibres but that which is said to take place at the chiasma, stimulation of one retina should affect both hemispheres equally, and the Salpêtrière experiments would lose all their import—that is, assuming that the prevailing opinion is the correct one—that the crossing of the fibres at this point is only partial. I am aware that this partial decussation is not admitted by all anatomists, and that the course of the optic fibres is still a matter of dispute: in fact, certain German anatomists, Biesiadecki, Mandelstamm, and Michel maintain that the fibres of the optic nerves undergo complete decussation at the chiasma, as occurs in fishes, amphibia, reptiles, and birds; and that the semi-decussation is to be looked upon simply as a theory, which, however, explains the facts observed in clinical medicine. I find that Ferrier also, in describing Charcot's scheme, characterizes it as unsatisfactory, and in contradiction with now well-established clinical as well as experimental facts.

It is therefore clear that the exact course of the fibres of the optic nerves is still undefined, and perhaps no question of late years has excited so much controversial discussion as the exact determination of the visual centre. The whole subject of the course of the fibres of the optic tract, and of the nervous connections of the retina with the brain, is discussed in an exhaustive manner by Professor Grasset, of Montpellier, who rejects the schemes both of Charcot and of his pupil Féré, for which he substitutes one of his own, frankly admitting, however, that it is purely hypothetical, but may be useful as a means of graphically representing the actual state of our knowledge of this difficult subject of cerebral semeiology. M. Grasset recognizes three decussations of the optic fibres:

1st. Semi-decussation at the chiasma, where the internal fibres cross, whilst the external fibres continue in a direct course.

2d. The external fibres cross in the neighborhood of the corpora quadrigemina, so that by this arrangement the decussation is complete, and thus all the optic fibres from one eye are reunited in the internal capsule of the opposite hemisphere.

3d. The external fibres undergo a further decussation, beyond the internal capsule, before terminating in the convolutions of the hemisphere, and by this means each occipital lobe will contain the external fibres from the eye of the same side and the internal fibres from the opposite eye.

M. Grasset adds that this triple seat of partial decussation seems to be indispensable for the proper interpretation of certain clinical facts; as to the exact locality in which it occurs, he suggests that it may be in the corpus callosum. He admits that the above arrangement is somewhat complex, but that the facts to be explained are of a no less complex character also.

Another author, Michael Foster, in writing upon this subject, says that the nervous centre is not a double centre with two completely independent halves, one for each eye; there is a certain amount of communion between the two sides, so that, when one retina is stimulated, both pupils contract. The authors of the Salpêtrière experiments, of course, assume that one retina only is stimulated, and only one hemisphere plunged into catalepsy.

Besides the conflicting opinions as to the points of decussation of the optic nerves, there would seem to be a further objection to the acceptance of the inference drawn from the Salpêtrière experiments in reference to the localization of the faculty of language. In order to establish any connection between these experiments and the localization of speech, it is necessary to assume that the fibres of the optic tract find their way into the anterior lobes of the brain, the supposed seat of speech—which is by no means universally admitted.

The course of the fibres of the optic tract between the external geniculate body and the cortex of the brain is not well ascertained, and is still the subject of scientific inquiry; at all events, a great diversity of opinion exists in reference to it. Gratiolet asserted that the optic tract is directly connected with every part of the cerebral hemisphere in man, from the frontal to the occipital region; and Professor Hamilton, of Aberdeen, in a communication to the Royal Society, on "The Cortical Connection of the Optic Nerves," expressed the same opinion.

In treating of this subject, that careful and accurate observer, Dr. Ross, says that both anatomical and physiological,as well as pathological observations, make it certain that most, if not all, of the fibres of the optic tracts terminate in the cortex of the occipital lobes, but that the course of the fibres in the intervening space between the cortex and the external geniculate body, is the subject which has excited the greatest controversy.

From a private communication with which Dr. Gowers has favored me, he speaks most emphatically upon this point, and says that his views of the physiology of the cortex would exclude altogether the idea of any passage of fibres from the optic tract to the motor speech region.

I have thought it desirable thus to enter at great length into the consideration of the bearing the experiments made at La Salpêtrière, upon persons in a state of hypnotism, may have upon the localization of functions, but I must think that our knowledge of the exact construction of the visual centre, of the precise distribution of the fibres of the optic tract, and of the relation of the two visual centres to each other, is at present so imperfect as not to justify the originators of the above interesting experiments to quote them as evidence of the localization of speech in any part of the left hemisphere of the brain.